Selective Kinetic Spectrophotometric Method for Determination of Gatifloxacin Based on Formation of its N-Vinyl Chlorobenzoquinone Derivative

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Abstract:

A selective and simple kinetic spectrophotometric has been developed, for the first time, for the determination of gatifloxacin (GAT) in its dosage forms. The method was based on the formation of a colored N-vinyl chlorobenzoquinone derivative of GAT by its reaction with 2,3,5,6-tetrachloro-1,4-benzoquinone in presence of acetaldehyde. The formation of the colored product was monitored spectrophotometrically by measuring the absorbances at 655 nm. The factors affecting the reaction were studied and optimized. The stoichiometry of the reaction was determined, and the reaction pathway was postulated. Under the optimized conditions, the initial rate and fixed time (at 5 min) methods were utilized for constructing the calibration graphs. The graphs were linear in the concentration ranges of 2-100 and 10-140 microg ml(-1) with limits of detection of 0.84 and 3.5 microg ml(-1) for the initial rate and fixed time methods, respectively. The analytical performance of both methods was fully validated, and the results were satisfactory. The proposed methods were successfully applied to the determination of GAT in its commercial dosage forms. The label claim percentages were 99.7-100.5 and 98.2-99.5% for the initial rate and fixed time methods, respectively. Statistical comparison of the results with those of the reference method showed excellent agreement and proved that there was no significant difference in the accuracy and precision between the reference and the proposed methods. The proposed methods are superior to all the previously reported spectrophotometric methods in terms of the procedure simplicity and assay selectivity.

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